

REMARKS

The Applicant thanks the Examiner for the thorough examination of the application. No new matter is believed to be added to the application by this Amendment.

Status Of The Claims

Claims 1, 2, 4-7 and 8-21 are pending in the application. Claims 3 and 7 have been cancelled, and their subject matter has been incorporated into claim 1. Claim 4 has been amended to not depend on a cancelled claim. The claims have been amended to improve their language and to remove the phrase "like." Claim 21 corresponds to claim 14 and finds additional support at page 7, line 12 of the specification.

Rejection Under 35 U.S.C. §112, Second Paragraph

Claims 1-20 are rejected under 35 U.S.C. §112, second paragraph as being indefinite. Applicant traverses.

In the Office Action, the Examiner asserts that the phrase "nest-like" and the phrase "rod-like" renders the claims indefinite by utilizing the term "like." The claims have been amended to remove the phrase "like." The claims are thus clear, definite and have full antecedent basis.

This rejection is overcome and withdrawal thereof is respectfully requested.

Rejection Under 35 U.S.C. §103(a) Over Dight and EP '220

Claims 1-20 are rejected under 35 U.S.C. §103(a) as being obvious over Dight (U.S. Patent 5,023,220) in view of EP '220 (EP 0 209 332). Applicant traverses.

The Present Invention And Its Advantages

The present invention pertains to a Y-zeolite containing composite materials made from kaolin materials by *in-situ* crystallization. These materials typically have a nest structure.

The Y zeolite containing composite material according to claim 1 of the present invention is synthesized by calcining kaolin at lower temperatures to convert it into metakaolin and then *in situ* crystallizing the same, wherein the content of NaY is from 30 to 85 wt%, and the equivalent diameter of said nest structure is in the range of from 1000 to 3000 nm. It is a material comprising a nanometer level NaY.

The present invention has many embodiments, and a typical embodiment can be found in claim 1:

1. A Y-zeolite-containing composite material, comprising a nest structure, said composite material comprising 30-85% Y-zeolite by weight and being matrix formed after crystallization of kaolin, and the crystal size of said Y-zeolite is in a range of 10-400 nm, and the equivalent diameter of said nest structure is in a range of 1000-3000 nm.

Distinctions of the Invention Over Dight and EP '332

Though the process for the preparation of the composite material of the present invention and the process in Dight prepare NaY by *in situ* crystallization, they are completely different processes. The process for the preparation of the composite material of the present invention (claim 14 or 21) differs from the process of Dight in that the process of the present invention

calcines kaolin at lower temperatures to convert it into metakaolin at first, which is then *in situ* crystallized into NaY, and the metakaolin that is not converted into NaY during the *in situ* crystallization forms the matrix.

The process in Dight, however, prepares a feed slurry comprising kaolin and first spray dries the slurry into microspheres, then calcines the microspheres to convert the kaolin therein into metakaolin and finally conducts an *in situ* crystallization to convert the metakaolin in the microspheres into NaY. As a result, the technology of Dight fails to disclose a process that yields the nest structure set forth in claim 1 of the present invention.

In Dight, in order to enhance the strength of the microspheres, the slurry (that is spray dried into microspheres) contains kaolin clay that has been calcined to undergo a characteristic exotherm. Calcining kaolin produces its characteristic exotherm to yield a spinel structure or form mullite (see column 5, line 64 to column 6, line 9 in U.S. Patent No. 6,696,378 B2, of record in the application, about the phase transition of kaolin in relation to calcination temperature).

The process of the present invention, however, neither spray dries the material into spheres nor contains the step of calcining the microspheres. Instead, the process of the present invention directly converts all kaolin powder into metakaolin at lower calcination temperatures in the absence of kaolin that has been calcined to undergo its characteristic exotherm. Subsequently, sodium silicate, a guide agent, basic solution and water are added to the metakaolin to prepare the composite material. Therefore, the prepared composite material has a nest structure, and the equivalent diameter thereof ranges from 1000 to 3000 nm. In comparison,

Dight synthesizes microspheres formed from NaY by *in situ* crystallization, and the diameter of

the microspheres ranges from 65 to 85 microns (column 8, lines 17 to 19), which is much larger than the equivalent diameter of the nest structure in the present invention.

Moreover, during the synthesis of NaY from the microspheres by *in situ* crystallization, it is impossible to form the nest structure of the composite material of the present invention, because the microspheres are formed from the kaolin that has been calcined to undergo its characteristic exotherm.

At page 4 of the Office Action, the Examiner unequivocally admits that Dight fails to disclose (1) the calcination temperature used to convert kaolin to metakaolin, and (2) the weight ratio of guide agent to metakaolin in the reaction feed mixture. The Examiner then turns to EP '332.

EP '332 concerns a process for synthesizing NaY by *in situ* crystallization, in which kaolin is used as the raw material. The EP '322 process calcines kaolin into metakaolin at first and then forms NaY therefrom by *in situ* crystallization. This process prepares a high purity 97% NaY. Therefore, EP '332 cannot obtain the nest structure of the composite material in this invention, and what is synthesized in EP '332 is not a composite material comprising nanometer level NaY, though EP '332 does mention that the temperature for converting kaolin into metakaolin ranges from 550 to 925°C. However, the calcination temperatures for preparing the metakaolin in the examples are all higher than 800 °C .

As a result, a person skilled in the art cannot arrive at the present invention by combining Dight, which conducts *in situ* crystallization in macropores of precursor microspheres, with EP '332, which prepares pure NaY, because they concern completely different processes. That is, the principle of operation must be changed in order to combine the references. If the proposed

modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

As a result, one having ordinary skill in the art would not be motivated by Dight and EP '332 to produce the present invention as embodied in claim 1. A *prima facie* case of obviousness has not been made. Claims depending upon claim 1 are patentable for at least the above reasons.

This rejection is overcome and withdrawal thereof is respectfully requested.

Prior Art

Among the references cited by the Examiner, references similar to Dight are U.S. Patent 4,965,233, U.S. Patent 3,506,594 and U.S. Patent 6,696,378 B2. All said three references prepare microspheres at first and then conducts *in situ* crystallization, and all the microspheres comprise kaolin that has been calcined undergoing its characteristic exotherm.

US2003/0199386 A1 also concerns a process that spray dries the raw material comprising kaolin into spheres and then conducts *in situ* crystallization thereof. Moreover, the microspheres comprise kaolin that has been calcined undergoing its characteristic exotherm. Therefore the process and the product of US2003/0199386 A1 are different from those of this invention.

The hydrous kaolin contained in the slurry for forming microspheres by spray drying in US2004/0235642 A1 is not crystallized during the synthesis of NaY from the microspheres by *in situ* crystallization, but is converted into a matrix. The filing date of this application is later than the priority date of the present invention, so that it is removable as prior art to the present invention.

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Information Disclosure Statement

The applicants thank the Examiner for considering the Information Disclosure Statement filed August 11, 2004 and for making the initialed PTO-1449 form of record in the application in the Office Action mailed July 26, 2005.

Conclusion

The Examiner's rejections have been overcome. No issues remain. The Examiner is accordingly respectfully requested to place the application in condition for allowance and to issue a Notice of Allowability.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Robert E. Goozner, Ph.D. (Reg. No.42,593) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

Application No. 10/809,345
Amendment dated October 26, 2005
Reply to Office Action of July 26, 2005

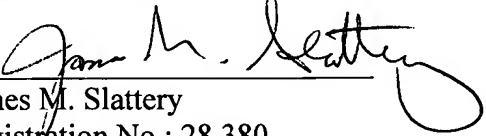
Docket No.: 0789-0183PUS1

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

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